

REMARKS

This is in response to the Office Action mailed on 01/18/2006. In the Office Action, (i) claims 1-3, 6-17, and 19-22 were rejected under the judicial double patenting doctrine; (ii) claims 1, 7-8, 15, and 20-21 were rejected under 35 USC 102(b); and (iii) claims 2-3, 6, 9-11, 13-14, 16-17, 19, and 22 were rejected under 35 USC 103(a);

Reexamination and reconsideration of this case is respectfully requested in view of the foregoing amendments and the following remarks.

Previously, claims 1-3, 6-11, 13-17, and 19-22 were pending. Claims 4-5, 12, 18, and 23-24 were previously cancelled without prejudice. Claims 1, 3, 6, 8, 15-17, and 21-22 have been amended by this response. New claims 25-33 have been added by this response. No further claim has been cancelled by this response. Accordingly, claims 1-3, 6-11, 13-17, 19-22, and 25-33 are now at issue in the patent application. Of those pending, claims 1, 8, 15, 21, 25, 28 and 30 are independent claims.

Applicant believes that no new matter has been added by this response.

I) SPECIFICATION AMENDMENT

In comparison with the preliminary amendment, Applicant has further amended the Related Patent Applications section, on page 2, line 4, of the specification to update the status of the parent patent application, now U.S. Patent No. 6,625,756.

In comparison with the preliminary amendment, Applicant has further amended a paragraph to update another instance of an incorrect reference number.

II) CLAIM REJECTION UNDER JUDICIAL DOUBLE PATENTING

In Section 1 of the Office Action, claims 1-3, 6-17, 19-22 were rejected under the judicially created doctrine ("non-statutory") of double patenting over Claims 1, 3-11, and 15 of U.S. Patent No. 6,625,756.

Applicant herewith provides a terminal disclaimer executed by William W. Schaal, Reg. No. 39,018 attached hereto as Appendix I.

Mr. William W. Schaal is an attorney of record as indicated in Appendix A of the "DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION" mailed in the parent patent application and filed coincidentally with the filing of this continuation patent application referenced above.

U.S. Patent No. 6,625,756 and the present continuation patent application are commonly owned by Intel Corporation.

Applicant believes that this rejection is now moot and respectfully requests the withdrawal of the judicial double patenting rejection of claims 1-3, 6-17, 19-22.

III) CLAIM REJECTION - 35 USC § 102(b)

Claims 1, 7-8, 15 and 20-21 were rejected under 35 USC § 102(b) as being anticipated by U.S. Pat. No. 4,912,707 issued to Kogge et al. ("Kogge"). [Office Action, Section 3]. Applicant respectfully traverses this rejection.

"To anticipate a claim, the reference must teach every element of the claim. 'A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art

reference.' *Verdegaal Bros. V. Union Oil co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... 'The identical invention must be shown in as complete detail as is contained in the claim.' *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." [MPEP § 2131, 8th Edition, Rev. 1, Feb. 2003, Pg. 2100-70].

Regarding independent claim 1, the Office Action alleges that "Kogge teaches a processor comprising: a protected execution unit to process instructions (column 5, lines 45-48); a check unit to detect an error associated with processed instructions (column 2, lines 47-50); and a replay queue to issue instructions to the protected execution unit for processing, track the issued instructions, and reissue selected issued instructions when the check unit detects an error (column 2, lines 47-58)." Applicant respectfully disagrees.

Applicant has amended independent claim 1 to clarify Applicant's claimed invention.

From the cited columns and lines of Kogge, the Office Action seems to allege that Kogge's error checker 74 discloses Applicant's check unit; and Kogge's checkpoint address register 46 discloses Applicant's replay queue. If this is not the case, Applicant respectfully requests clarification.

Applicant has reviewed the col. 2, lines 47-58 of Kogge, Kogge's checkpoint address register 46 does not function to issue instructions to Kogge's arithmetic logic unit 22. Nor does Kogge's checkpoint address register 46 function to reissue instructions to Kogge's arithmetic logic unit 22. Nor does Kogge's checkpoint address register 46 function to track **a plurality of instructions** issued to Kogge's arithmetic logic unit 22. (emphasis added)

Moreover, as illustrated by Kogge's Figures 1,3, Kogge's checkpoint address register 46 is not structurally coupled to Kogge's error checker 74.

That is, Applicant respectfully submits that Kogge does not disclose Applicant's "at least one replay queue coupled to the check unit and to the protected execution unit, the at least one replay queue to issue a plurality of instructions to the protected execution unit for processing, to track the plurality of instructions issued to the protected execution unit, and to selectively reissue one or more of the plurality of instructions to the protected execution unit when the check unit detects an error" as is now recited in amended independent claim 1.

Thus for the foregoing reasons, Applicant respectfully submits that Kogge does not anticipate Applicant's amended independent claim 1.

Regarding independent claim 8, the Office Action alleges that "Kogge teaches a method for executing instructions with high reliability (column 5, lines 45-48), comprising: storing an instruction temporarily in a replay buffer (column 2, lines 54-58); issuing the instruction to a protected execution unit (column 5, lines 45-48); checking results generated by the instruction in the protected execution unit (column 5, lines 48-52); and reissuing the instruction to the protected execution unit if an error is indicated (column 2, lines 54-58; column 5, lines 64-67)." Applicant respectfully disagrees.

Applicant has amended independent claim 8 to clarify Applicant's claimed invention.

Applicant respectfully submits that neither Kogge's checkpoint address register nor Kogge's instruction memory address register store an instruction. As their name admits,

Kogge's checkpoint address register and Kogge's instruction memory address register **only store an address**.

In contrast, Applicant's replay buffer stores instructions. Moreover, Applicant respectfully submits that neither Kogge's checkpoint address register nor Kogge's instruction memory address register store **a plurality of instructions** as is now recited in Applicant's amended claim 8.

Thus for the foregoing reasons, Applicant respectfully submits that Kogge does not anticipate Applicant's amended independent claim 8.

Regarding independent claim 15, the Office Action alleges that "Kogge teaches a computer system comprising: a processor that includes: a protected execution unit to execute instructions in a manner that facilitates soft error detection (column 7, lines 30-33); a check unit to monitor the protected execution unit and to generate a signal when an error is indicated (column 6, lines 59-63); a replay unit to provide instructions to the protected execution unit, track the instructions until they are retired, and replay selected instructions when the check unit indicates an error (column 2, lines 47-58); and a storage structure to provide a recovery algorithm to the processor when replay of selected instructions does not eliminate the mismatch (column 9, lines 29-30, 35-37, 40-42, wherein it is inherent that software-controlled recovery program be stored in a memory)." Applicant respectfully disagrees.

Applicant has amended independent claim 15 to clarify Applicant's claimed invention.

From the cited columns and lines of Kogge, the Office Action seems to allege that Kogge's error checker 74 discloses Applicant's check unit; and Kogge's checkpoint address register 46 discloses Applicant's replay unit. If this is not the case, Applicant respectfully requests clarification.

Applicant has reviewed col. 2, lines 47-58 of Kogge. Kogge's checkpoint address register 46 does not function to issue instructions to Kogge's arithmetic logic unit 22. Nor does Kogge's checkpoint address register 46 function to reissue instructions to Kogge's arithmetic logic unit 22. Nor does Kogge's checkpoint address register 46 function to track **a plurality of instructions** issued to Kogge's arithmetic logic unit 22. (emphasis added)

Moreover, as illustrated by Kogge's Figures 1,3, Kogge's checkpoint address register 46 is not structurally coupled to Kogge's error checker 74.

That is, Applicant respectfully submits that Kogge does not disclose Applicant's "replay unit coupled to the protected execution unit and the check unit, the replay unit to temporarily store a plurality of instructions and provide the plurality of instructions to the protected execution unit for execution, the replay unit to track the plurality of instructions until they are retired, and the replay unit to repetitively replay selected instructions of the plurality of instructions when the check unit indicates an error" as is now recited in amended independent claim 15.

Thus for the foregoing reasons, Applicant respectfully submits that Kogge does not anticipate Applicant's amended independent claim 15.

Regarding independent claim 21, the Office Action alleges that "Kogge teaches a processor comprising: first and second execution cores to process identical instructions in lock step, each execution core including a replay unit to track instructions that have yet to retire (column 5, lines 40-48, wherein Kogge teaches that a retry mechanism be connected to each ALU); and a check unit to compare instructions results generated by the execution cores and to trigger the replay unit to resteer the first and second execution cores to an instruction when the instruction results generate a mismatch (column 5, lines 48-68)." Applicant respectfully disagrees.

Applicant has amended independent claim 21 to clarify Applicant's claimed invention.

From the cited columns and lines of Kogge, the Office Action seems to allege that Kogge's error checker 74 discloses Applicant's check unit. If this is not the case, Applicant respectfully requests clarification.

As illustrated by Kogge's Figures 1,3, Kogge's error checker 74 only couples to a single ALU 22. Kogge's error checker 74 does not structurally couple to ALU 22 and ALU 22'.

That is, Applicant respectfully submits that Kogge does not disclose Applicant's "check unit coupled to the first and second execution cores and the replay unit, the check unit to compare instructions results generated by the execution cores in their respective detect stages prior to retirement and to trigger the replay unit to resteer the first and second execution cores to re-execute one or more selected instructions in their respective instruction execution pipelines when the instruction results generate a mismatch" as is now recited in amended independent claim 21.

Thus for the foregoing reasons, Applicant respectfully submits that Kogge does not anticipate Applicant's amended independent claim 21.

Claim 7 depends from independent claim 1. Claim 20 depends from independent claim 15. Applicant believes that independent claims 1 and 15 have been placed in condition for allowance such that dependent claims 7 and 20 depending respectfully there-from are also in condition for allowance.

Accordingly, for the foregoing reasons, Applicant respectfully requests the withdrawal of the 35 U.S.C. § 102(b) claim rejection of claims 1, 7, 8, 15, 20, and 21 over Kogge.

IV) CLAIM REJECTIONS - 35 USC § 103(a)

Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kogge in view of U.S. Patent No 5,604,753 issued to Bauer et al. ("Bauer"). [Office Action, Section 5]. Applicant respectfully traverses this rejection.

Claims 3, 9, 10, 11, 13, 14, 16, and 22 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kogge in view of U.S. Patent No. 5,659,721 issued to Shen, et al. ("Shen"). [Office Action, Section 6]. Applicant respectfully traverses this rejection.

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kogge in view of U.S. Patent 5,247,628 issued to Gregory F. Grohoski ("Grohoski"). [Office Action, Section 7]. Applicant respectfully traverses this rejection.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kogge in view of Shen and further in view of Bauer. [Office Action, Section 8]. Applicant respectfully traverses this rejection.

Claim 19 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kogge in view of Shen and further in view of "Computer Organization and Design" written by John L. Hennessy and David A. Patterson ("Hennessy"). [Office Action, Section 9]. Applicant respectfully traverses this rejection.

"To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)" [MPEP § 2142; 8th Edition, Rev. 1, Feb. 2003, Pg. 2100-124].

Rejected claims 2-3, and 6 are dependent indirectly or directly from independent claim 1.

Rejected claims 9-11, and 13-14 are dependent indirectly or directly from independent claim 8.

Rejected claims 16-17, and 19 are dependent indirectly or directly from independent claim 15.

Rejected claim 22 is dependent directly from independent claim 21.

Each of the 35 USC 103(a) claim rejections of dependent claims 2-3, 6; 9-11, 13-14; 16-17, 19; and 22 relies on Kogge. Thus, the prior remarks regarding independent claims 1, 8, 15 and 21 and the 35 USC 102(b) claim rejections are incorporated here by reference. Applicant respectfully submits that independent claims 1, 8, 15 and 21 are not made obvious by the cited prior art references for the same reasons.

Applicant believes that independent claims 1 8, 15 and 21 have been placed in condition for allowance such that dependent claims depending respectfully there-from are also in condition for allowance.

Accordingly, for the foregoing reasons, Applicant respectfully requests the withdrawal of the 35 U.S.C. § 103(a) claim rejections of dependent claims 2-3, 6; 9-11, 13-14; 16-17, 19; and 22.

V) NEW CLAIMS

Applicant has added new claims 25-33.

New claims 25, 28 and 30 are new independent claims.

Claims 26-27 depend from independent claim 25. Claim 29 depends from independent claim 28. Claims 31-33 depend from independent claim 30.

Applicant respectfully submits that new claims 25-33 are not anticipated by Kogge nor made obvious by the cited prior art references. Accordingly, Applicant respectfully submits that new claims 25-33 are also in condition for allowance over the cited prior art references.

CONCLUSION

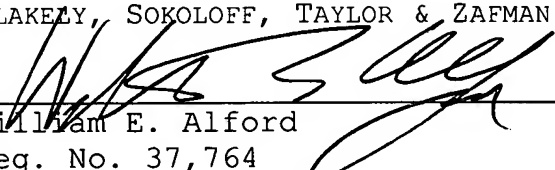
In view of the foregoing, it is respectfully submitted that the pending claims are in condition for allowance. Reconsideration of the claim rejections is requested. Allowance of the pending claims at an early date is solicited.

The Examiner is invited to contact Applicant's undersigned counsel by telephone at (714) 557-3800 to expedite the prosecution of this case should there be any unresolved matters remaining. To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees in connection with the filing of this paper, including extension of time fees, to Deposit Account 02-2666 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Dated: July 18, 2006



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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on: July 18, 2006.



Tu Nguyen
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